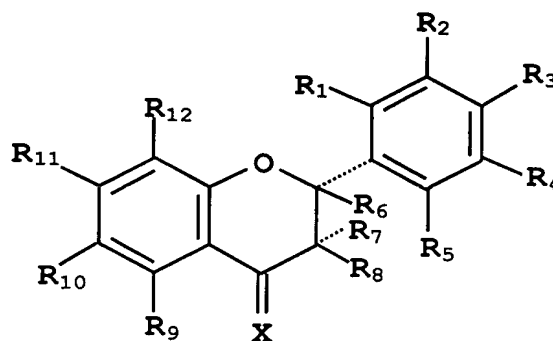


CLAIMS

What is claimed is:

1. A compound of the formula:



Wherein,

X is selected from O and S; and

i) when X is O,

R₁, R₄, R₅ and R₈ are H or F;

R₆ and R₇ combine to form a double bond;

R₂ and R₃ are selected from H, OH, SH, Halogen, Alkyl, Amino, HNMe, Cyano, Carboxyl, Carboxyalkyl, Carboxamide, alkoxycarbonyl, O-Hydroxyalkyl, CF₃, O-Alkyl, O-SO₃H, O-SO₂H, O-PO₃H, O-Glycoside, O-Glucoronide and O-Amino Acid, including O-CO-A-(CH₂)_n-NR'R'', where A is Phenyl, substituted phenyl or absent; n is 0 through 5; R' and R'' are selected from H, lower alkyl, hydroxyalkyl, aminoalkyl, mono and dialkylaminoalkyl, carboxyalkyl or R' and R'' may combine to form a cyclic ring, optionally substituted with a O, S, NH or N-Alkyl and the methylene adjacent to the nitrogen may be optionally substituted with a amino alkyl,

carboxy or carboxyalkyl group and $\text{O-CO-NH-(CH}_2\text{)}_m\text{-CH-(NH}_2\text{)COOH}$, where m is 1 through 4 ; and when R_2 and R_3 are OH, SH or Amino, they may be optionally combined through a methylene or carbonyl group;

R_9 is selected from OH, Amino, NHMe, SH, or SMe; and

R_{10} and R_{11} or R_{11} and R_{12} are methylenedioxy ($\text{O-CH}_2\text{-O}$), or a cyclic carbonate (O-CO-O), or R_{12} is H and R_{10} , R_{11} , are selected from H, OH, Halogen such as F or Cl, Alkyl, Amino, Cyano, Carboxyl, Carboxyalkyl, Carboxamide, alkoxycarbonyl, O-Hydroxyalkyl, CF_3 , O-Alkyl, $\text{O-SO}_3\text{H}$, $\text{O-SO}_2\text{H}$, $\text{O-PO}_3\text{H}$, O-Glycoside, O-Glucoronide and O-Amino Acid, including $\text{O-CO-A-(CH}_2\text{)}_n\text{-NR'R''}$, where A is Phenyl, substituted phenyl or absent; n is 0 through 5; R' and R'' are selected from H, lower alkyl, hydroxyalkyl, aminoalkyl, mono and dialkylaminoalkyl, carboxyalkyl or R' and R'' may combine to form a cyclic ring, optionally substituted with a O, S, NH or N-Alkyl and the methylene adjacent to the nitrogen may be optionally substituted with a amino alkyl, carboxy or carboxyalkyl group and $\text{O-CO-NH-(CH}_2\text{)}_m\text{-CH-(NH}_2\text{)COOH}$, where m is 1 through 4; with the proviso that when R_2 and/or R_3 are H, OH, OMe, Cl, or Amino then R_9 , R_{10} , and R_{11} are not the same.

ii) when X is S,

R_1 through R_5 and R_9 through R_{12} are selected from H, OH, Halogen such as F or Cl, SH, SMe, Alkyl, Amino, NHMe, Cyano, Carboxyl, Carboxyalkyl, Carboxamide, alkoxycarbonyl, O-Hydroxyalkyl, CF_3 , O-Alkyl, $\text{O-SO}_3\text{H}$, $\text{O-SO}_2\text{H}$, $\text{O-PO}_3\text{H}$, O-Glycoside, O-Glucoronide and O-Amino Acid, including $\text{O-CO-A-(CH}_2\text{)}_n\text{-NR'R''}$, wherein A is phenyl, substituted phenyl or absent; wherein n is 0 through 5, wherein R' and R'' are selected from H, lower alkyl, hydroxyalkyl, aminoalkyl, mono and dialkylaminoalkyl, carboxyalkyl or wherein R' and R'' combine to form a

55 cyclic ring, said cyclic ring being optionally substituted with a O, S, NH or
56 N-Alkyl and wherein the methylene adjacent to the nitrogen may be
57 optionally substituted with a amino alkyl, carboxy or carboxyalkyl group
58 and O-CO-NH-(CH₂)_m-CH-(NH₂)COOH wherein m is 1 through 4;

59
60 R₆ and R₇ combine to form a double bond;

61
62 R₈ is selected from H or F; and,

63 when R₁ through R₅ and R₉ through R₁₂ are OH and/or amino, and
64 are present on adjacent ring carbons then they may be combined through
65 a methylene (-O-CH₂-O-) or a carbonyl (-O-CO-O-, -O-CO-NH- or S-CO-
66 NH-) group to form a cyclic ring.
67

1 2. A compound according to Claim 1 wherein R₁₀ and R₁₂ are OH.

1 3. A compound according to Claim 1 wherein the compound is 5-Hydroxy-3',
2 4', 7-tricarboxymethoxyflavone.

1 4. A compound according to Claim 1 wherein the compound is 6,7
2 Methylenedioxy-3', 4', 5-trihydroxyflavone.

1 5. A compound according to Claim 1 wherein the compound is 7,8
2 Methylenedioxy-3', 4', 5-trihydroxyflavone.

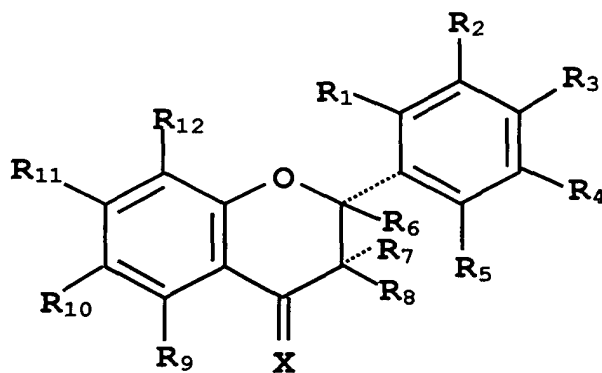
1 6. A compound according to Claim 1 wherein the compound is 6,7-
2 Carbonyloxy-3', 4', 5- trihydroxyflavone.

1 7. A compound according to Claim 1 wherein the compound is 3',4'-
2 Carbonyloxy-5,7-dihydroxyflavone.

1 8. A compound according to Claim 1 wherein the compound is 3', 5, 7-
2 Trihydroxyflavone-4'-phosphate.

1 9. A compound according to Claim 1 wherein the compound is 3', 5, 7-
2 Trihydroxy -4'-(2-amino-1- carboxypropyloxy) flavone.

1 10. A method for inhibiting T-lymphocyte activativity in a human or veterinary
2 patient, said method comprising the step of administering to the patient, in an
3 amount that is effective to inhibit T-lymphocyte activity, a compound having the
4 formula:
5



6

7

8 Wherein,

9

10 X is selected from O and S;

11

12 R1 through R5 and R9 through R12 are selected from H, OH, SH, Sme, Halogen,
13 Alkyl, Amino, Cyano, Carboxyl, Carboxyalkyl, Carboxamide, alkoxycarbonyl, O-
14 Hydroxyalkyl, CF3, O-Alkyl, O-SO3H, O-SO2H, O-PO3H, O-Glycoside, O-
15 Glucoronide and O-Amino Acid, including O-CO-A-(CH2)*n*-NR'R'', where A is

16 Phenyl, substituted phenyl or absent; n is 0 through 5; R' and R'' are selected
17 from H, lower alkyl, hydroxyalkyl, aminoalkyl, mono and dialkylaminoalkyl,
18 carboxyalkyl or R' and R'' may combine to form a cyclic ring, optionally
19 substituted with a O, S, NH or N-Alkyl and the methylene adjacent to the nitrogen
20 may be optionally substituted with a amino alkyl, carboxy or carboxyalkyl group
21 and O-CO-NH-(CH₂)_m-CH-(NH₂)COOH, where m is 1 through 4;

22

23 R₆ and R₇ are H or may combine to form a doublebond;

24

25 R₈ is selected from H, Halogen, Alkyl, Amino, Cyano, Carboxyl, Carboxyalkyl,
26 Carboxamide, alkoxycarbonyl and CF₃. Furthermore, when R₁ through R₅ and
27 R₉ through R₁₂ are OH, SH or amino and are present on adjacent ring carbons
28 then they may be combined through a methylene (-O-CH₂-O-) or a carbonyl (-O-
29 CO-O-, -O-CO-NH- or -S-CO-NH-) group to form a cyclic ring. Most preferred
30 are 6,7 and 7,8-methylenedeoxy and 3',4'-carbonyloxy (cyclic carbonate)
31 derivatives.

1 11. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating diabetes or stabilizing the patient's blood glucose levels and
3 wherein the compound is not luteolinthe 5 glucoside of luteolin, the 7 glucoside of
4 luteolin,or apigenin.

1 12. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating Amyotrophic Lateral Sclerosis and wherein the compound is
3 not luteolin, genistein, or daidzein.

1 13. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating Amyotrophic Lateral Sclerosis and wherein the method
3 comprises the step of administering a compound of the formula set forth in Claim
4 10 in combination with another compound.

16 Phenyl, substituted phenyl or absent; n is 0 through 5; R' and R'' are selected
17 from H, lower alkyl, hydroxyalkyl, aminoalkyl, mono and dialkylaminoalkyl,
18 carboxyalkyl or R' and R'' may combine to form a cyclic ring, optionally
19 substituted with a O, S, NH or N-Alkyl and the methylene adjacent to the nitrogen
20 may be optionally substituted with a amino alkyl, carboxy or carboxyalkyl group
21 and O-CO-NH-(CH₂)_m-CH-(NH₂)COOH, where m is 1 through 4;

22

23 R₆ and R₇ are H or may combine to form a doublebond;

24

25 R₈ is selected from H, Halogen, Alkyl, Amino, Cyano, Carboxyl, Carboxyalkyl,
26 Carboxamide, alkoxycarbonyl and CF₃. Furthermore, when R₁ through R₅ and
27 R₉ through R₁₂ are OH, SH or amino and are present on adjacent ring carbons
28 then they may be combined through a methylene (-O-CH₂-O-) or a carbonyl (-O-
29 CO-O-, -O-CO-NH- or -S-CO-NH-) group to form a cyclic ring. Most preferred
30 are 6,7 and 7,8-methylenedeoxy and 3',4'-carbonyloxy (cyclic carbonate)
31 derivatives.

1 11. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating diabetes or stabilizing the patient's blood glucose levels and
3 wherein the compound is not luteolinthe 5 glucoside of luteolin, the 7 glucoside of
4 luteolin,or apigenin.

1 12. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating Amyotrophic Lateral Sclerosis and wherein the compound is
3 not luteolin, genistein, or daidzein.

1 13. A method according to Claim 10 wherein the method is carried out for the
2 purpose of treating Amyotrophic Lateral Sclerosis and wherein the method
3 comprises the step of administering a compound of the formula set forth in Claim
4 10 in combination with another compound.

- 1 14. A method according to Claim 10 wherein the compound is administered in
2 combination with Rutin, a congener of Rutin or derivative of Rutin.
- 1 15. A method according to Claim 14 wherein a) the compound of Claim 10
2 and b) the Rutin, congener of Rutin or derivative of Rutin are administered in a
3 weight ratio of about 50%/50%.
- 1 16. A method according to Claim 14 wherein a) the compound of Claim 10
2 and b) the Rutin, congener of Rutin or derivative of Rutin are administered in a
3 weight ratio of about 75%/25%.
- 1 17. A method according to Claim 14 wherein a) the compound of Claim 10
2 and b) the Rutin, congener of Rutin or derivative of Rutin are administered in a
3 weight ratio of about 50%/50% to about 75%/25%.
- 1 18. A method according to Claim 10 wherein the compound of Claim 10
2 undergoes first pass metabolism when absorbed through the gastric and/or
3 intestinal mucosa and wherein the compound of Claim 10 is administered so as
4 to be substantially absorbed by a route other than through the gastric and/or
5 intestinal mucosa.
- 1 19. A method according to Claim 18 wherein the compound is administered so
2 as to be substantially absorbed via the patient's sublingual mucosa.
- 1 20. A method according to Claim 18 wherein the compound is administered so
2 as to be substantially absorbed via the patient's buccal mucosa.
- 1 21. A method according to Claim 18 wherein the compound is administered so
2 as to be substantially absorbed via the patient's rectal mucosa.

1 22. A method according to Claim 18 wherein the compound is administered so
2 as to be substantially absorbed via the patient's nasal mucosa.

1 23. A method according to Claim 18 wherein the compound is administered so
2 as to be substantially absorbed via the patient's sublingual mucosa.

1 24. A method according to Claim 18 wherein the compound administered so
2 as to be substantially absorbed through the patient's skin.

1 25. A method according to Claim 18 wherein the compound is administered by
2 injection.

1 26. A method according to Claim 10 wherein R10 and R12 are OH.

1 27. A method according to Claim 10 wherein the compound is 6,7
2 Methylenedioxy-3', 4', 5-trihydroxyflavone.

1 28. A method according to Claim 10 wherein the compound is 7,8
2 Methylenedioxy-3', 4', 5-trihydroxyflavone.

1 29. A method according to Claim 10 wherein the compound is 6,7-
2 Carbonyloxy-3', 4', 5- trihydroxyflavone.

1 30. A method according to Claim 10 wherein the compound is 3',4'-
2 Carbonyloxy-5,7-dihydroxyflavone.

1 31. A method according to Claim 10 wherein the compound is 3', 5,7-
2 Trihydroxyflavone-4'-phosphate.

1 32. A method according to Claim 10 wherein the compound is 3', 5, 7-
2 Trihydroxy -4'-(2-amino-1- carboxypropyloxy) flavone.

1 33. A method according to Claim 10 wherein the compound is 5-Hydroxy-3',
2 4', 7-tricarboxymethoxyflavone.

1 34. A method according to Claim 10 wherein the compound is luteolin.

1 35. A method according to Claim 10 wherein the compound is luteolin and
2 wherein the method further comprises administering to the patient rutin, a rutin
3 congener or a rutin analog in an amount that is effective to enhance the efficacy
4 or duration of action of the luteolin.

1 36. A method according to Claim 10 wherein the compound is administered in
2 combination with genistein (5,7-Dihydroxy-3-(4-hydroxyphenyl)--4H-
3 1benzopyran-4-one or 4', 5, 7-trihydroxyisoflavone).

1 37. A method according to Claim 10 wherein the compound is administered in
2 combination with daidzein (7-Hydroxy-3-(4-hydroxyphenyl)-4H-1benzopyran-4-
3 one OR 4', 7-dihydroxyisoflavone).